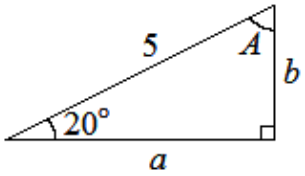
Practice Worksheet:

Some Additional Practice for the Final Exam

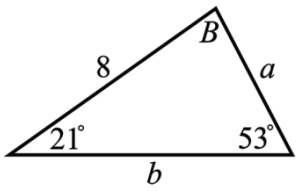
This isn't meant to be a "practice test" or "the only thing you need to study to be prepared for the exam." It's just some additional practice problems covering the material that we studied after the Midterm. In addition to the problems below, you should also study the Class Notes Videos, the Online Lecture Notes, the Practice Worksheets (especially "Practice Worksheet for Midterm"), the Weekly Graded Worksheets, and the suggested practice problems from the online textbook.

1. Find the missing side(s) and missing angle(s) for the triangles given below. (The triangles may not be drawn to scale.)

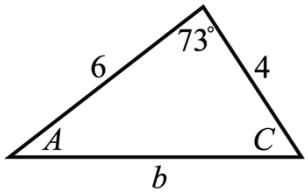
a.



b.



c.



2. Suppose that $\sin(\alpha) = \frac{5}{13}$ and $\cos(\beta) = \frac{3}{5}$, and where $0 < \alpha < \frac{\pi}{2}$ and $\frac{3\pi}{2} < \beta < 2\pi$. Find the exact value of:

a. $\sin(\alpha + \beta)$.

b. $\cos(\alpha - \beta)$.

c. $\sin(2\beta)$.

d. $\cos(2\beta)$.

e. $\sin\left(\frac{\beta}{2}\right)$.

f. $\cos\left(\frac{\beta}{2}\right)$.

3. Prove the following identities.

a. $\tan(x) + \cot(x) = \sec(x)\csc(x)$

b. $\tan^2(x) - \sin^2(x) = \tan^2(x)\sin^2(x)$

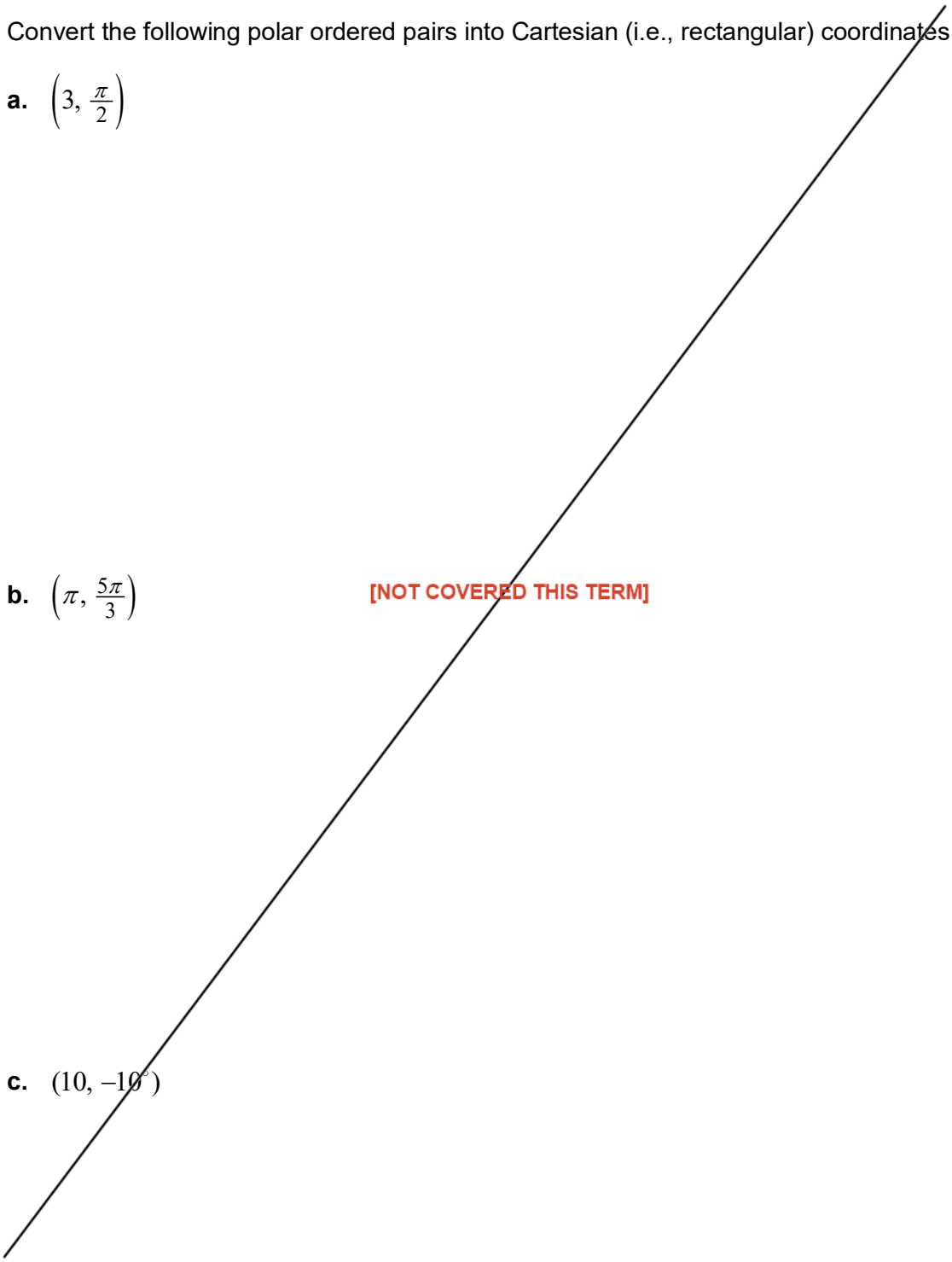
c. $\cos(2x) = \cos^4(x) - \sin^4(x)$

4. Convert the following polar ordered pairs into Cartesian (i.e., rectangular) coordinates.

a. $\left(3, \frac{\pi}{2}\right)$

b. $\left(\pi, \frac{5\pi}{3}\right)$ [NOT COVERED THIS TERM]

c. $(10, -10^{\circ})$



5. Convert the following Cartesian (i.e., rectangular) ordered pairs into polar coordinates.

a. $(10, -10)$

b. $(-3, 0)$

[NOT COVERED THIS TERM]

c. $\left(-8, -8\sqrt{3}\right)$

6. Translate the complex number $z = -3 + 3\sqrt{3} \cdot i$ into its polar form $z = re^{i\theta}$.

[NOT COVERED THIS TERM]

7. Translate the polar form of the complex number $z = 4e^{i \cdot \frac{5\pi}{6}}$ into its rectangular form $z = a + bi$.

8. Determine the magnitude and direction (with respect to the positive x-axis) of the vector $\vec{v} = \langle -3, -7 \rangle$.

9. **a.** Find the horizontal and vertical components of the vector $\vec{v}$ that starts at the point $P = (5, 6)$ and ends at the point $Q = (2, 2)$.

b. Find the magnitude, $\|\vec{v}\|$, and the direction (with respect to the positive x-axis) of the vector $\vec{v}$ that you found in part **a**?

10. Suppose $\vec{v} = \langle -4, 1 \rangle$ and $\vec{u} = \langle 3, -6 \rangle$.

a. Find $\vec{w} = \vec{v} - 2\vec{u}$.

b. Use the *dot product* to find the angle between $\vec{v} = \langle -4, 1 \rangle$ and $\vec{u} = \langle 3, -6 \rangle$?